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Note on the Variable Star D.M. $+1°$ *No.* 3408. By Professor C. Pritchard.

On the receipt, Dec. 5, of the Dun Echt Circular, No. 41, relative to the variability of the star D.M. $+1°$ No. 3408, after the manner of the Algol type, I instructed Mr. Plummer to make comparisons of its brightness by the photometric means which I described in the *Monthly Notices* of last month.

The comparison stars taken were D.M. $+2°$ No. 3283 (α) and $+1°$ No. 3411 (β). The variable star is denoted by V.

Dec. 5, $4^{\rm h}\ 57^{\rm m}$ G.M.T. ... ... $V-\alpha = {\cdot}31$ magnitude
7, 5 9 ... ... $V-\alpha = {\cdot}30$ „

These results were further confirmed by comparison of (α) with (β), and each with V, thus—

Dec. 7, $5^{\rm h}\ 28^{\rm m}$ G.M.T. ... ... $\beta-V = {\cdot}34$ magnitude
7, 5 14 ... ... $\beta-\alpha = {\cdot}54$ „

These last two comparisons would give $V-\alpha = {\cdot}20$ magnitude, implying a discordance of only one-tenth of a magnitude among these insufficient observations, made, as will be explained, under somewhat unfortunate circumstances. In these results, regarding the brightness of the variable at the above epochs, there is little or nothing noteworthy, inasmuch as the variation of light is said to be of the Algol type, and neither of the times of observation is that of a minimum as recorded by Mr. Sawyer. Assuming with Argelander that $\alpha = 6{\cdot}5$ mag., $V = 6{\cdot}8$ magnitude. This is altogether at variance with Argelander's estimate 5·5; an estimate certainly not by any means borne out by the eye on Dec. 5 and Dec. 7, and which eye-observation agrees substantially with the wedge-reading. Neither do these photometric observations agree with Mr. Sawyer's estimate of variation from the 6th to 6·7 magnitude; but we are left in doubt as to Mr. Sawyer's standard of magnitude.

Unfortunately, the Sun is even now far too close to the star to admit of a very reliable determination of its brightness, or varying brightness, and this increasing proximity will effectually prevent further comparison for some time to come. The very singular discordances recorded in the estimates of its magnitude, varying from 5·5 to 8·0 magnitude, by astronomers so able as Schjellerup, Lamont ,and Argelander, will render this star an object of interest and inquiry a few months hence, when the Sun will have quitted its vicinity. The above observations are to

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be regarded simply as a record for comparison with other observers, who may also have already made similar measures.

It may interest some members of the Society who are skilled in astrometry, to be informed that the photometric measures of the relative brightness of all the stars in *Lyra* contained in Dr. Heis' Catalogue, 75 in number, together with two others which ought have been inserted on account of their brilliancy, have now been completed at this Observatory by three sets of five readings on two nights. The consistency of the results is encouraging, and leaves no doubt in my mind of the facility and accuracy of the method devised. I have accordingly arranged for the systematic prosecution of these observations for all the stars visible *nudis oculis* from the Pole to 5° South Declination. This will embrace all the stars recorded in Dr. Heis' Catalogue within the limits prescribed.

Oxford University Observatory:
1881, *December* 8.

On a Method for Finding the Elements of the Orbit of a Comet by a Graphical Process. By F. C. Penrose, Esq.

It may be interesting to those who are not familiar with the analytical methods of working out the orbit of a Comet to examine a process of graphical construction which will, in many instances at any rate, suffice to give very rapidly a good approximate solution by means which demand only conversance with the methods of practical geometry and sufficient spherical trigonometry to reduce Declination and Right Ascension into latitude and longitude.

I was first led to try if by graphical operations I could get a general idea of the motion of Tebbutt's Comet (1881, *b*), and finding that I succeeded to a greater extent than I had anticipated, I proceeded to attack Schäberle's Comet *c*, with some diffidence, indeed, as it seemed to be giving a good deal of trouble to the computers, and obtained a result which I found compared favourably with the published elements. I venture, therefore, to think that these attempts may be worth laying before the Society.

I should premise that I do not think that much reliance could be placed on a graphical solution of the orbit of a Comet from a few days' observation only, unless it should happen to be near the Earth or to the perihelion; and also that four places are much better than three, although it would be of course theoretically possible to find the elements from three. I will begin with the case of Tebbutt's Comet (Comet *b*, 1881).

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